No. 8200036

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

North American Plant Breeders

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF eighteen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC ED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXOTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, O RTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT HEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT 2, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

ALFALFA

'Baron'

U.S. PLANT VARIETY PROTECTION OFFICE · U.S. DEPARTMENT OF AGRICULTURE

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington *this* 11th *day of* March *in the year of our Lord one thousand nine hundred and* eighty-two.

Attest:

Kenneth H. E

Acting

Commissioner

Plant Variety Protection Office

Grain Division

Agricultural Marketing Service

John R Block

Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, MEAT, GRAIN & SEED DIVISION

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

FORM APPROVED: OMB NO. 0581-0005

No certificate for plant variety protection may be issued unless a completed application form has been received (5 U.S.C. 553).

1. NAME OF APPLICANT(S)
North American Plant Breeders

2. TEMPORARY DESIGNATION
NAPB 92

3. VARIETY NAME
Baron

4. ADDRESS *(Street and No. or R.F.D. No., City, State, and Zip Code)*
North American Plant Breeders, 5201 Johnson Drive, P. O. Box 2955, Mission, KS 66201

5. PHONE *(Include area code)*
(913) 384-4940

FOR OFFICIAL USE ONLY

PVPO NUMBER
8200036

6. GENUS AND SPECIES NAME
Medicago sativa

7. FAMILY NAME *(Botanical)*
~~Leguminacea~~
LEGUMINOSAE

FILING
DATE 12/11/81
TIME 12:00 ☐ A.M. ☒ P.M.

8. KIND NAME
Alfalfa

9. DATE OF DETERMINATION
February 1979

FEES RECEIVED
AMOUNT FOR FILING
$ 500.00
DATE 12/11/81
AMOUNT FOR CERTIFICATE
$ 250.00
DATE 2/16/82

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*
Corporation

11. IF INCORPORATED, GIVE STATE OF INCORPORATION
Connecticut

12. DATE OF INCORPORATION
3-9-73

13. NAME AND ADDRESS OF APPLICANT REPRESENATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS
Mr. Giles Dixon, North American Plant Breeders, P. O. Box 2955, Mission, Kansas 66201

Dr. Jim B. Moutray, North American Plant Breeders, R. R. #3, Ames, Iowa 50010

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED

a. ☒ Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*

b. ☒ Exhibit B, Novelty Statement

c. ☒ Exhibit C, Objective Description of the Variety *(Request form from Plant Variety Protection Office.)*

d. ☐ Exhibit D, Additional Description of the Variety

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See Section 83(a) of the Plant Variety Protection Act.)*
☐ Yes *(If "Yes," answer items 16 and 17 below)* ☒ No

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☒ Yes ☐ No

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☒ Foundation ☐ Registered ☒ Certified

18. DID THE APPLICANT(S) FILE FOR PROTECTION OF THE VARIETY IN THE U.S. OR OTHER COUNTRIES?
☐ Yes *(If "Yes," give names of countries and dates)*
☒ No

19. HAVE RIGHTS BEEN GRANTED IN THE U.S. OR OTHER COUNTRIES?
☐ Yes *(If "Yes," give names of countries and dates)*
☒ No

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT
Giles E. Dixon
DATE 12-7-81

SIGNATURE OF APPLICANT
J B Moutray
DATE 11/17/81

FORM LMGS-470 (9-81) (Edition of 1-78 is obsolete)

Exhibit A

Origin and Breeding History of the Variety

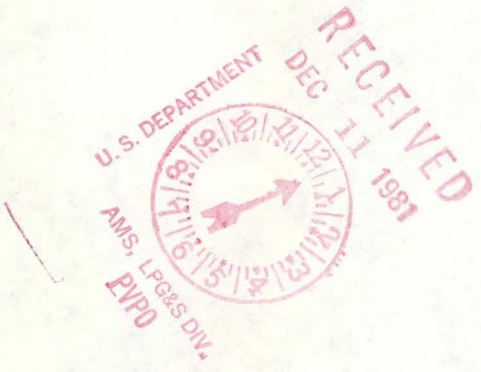
'Baron'

'Baron is an intermediate dormant variety composed of 654 clones. It was selected from the varieties 'El Unico', 'Mesa Sirsa', 'Hayden', 'Mesilla', 'Kanza', 'WL 318', 'Pioneer 530' and 'Acco 765'. These varieties have been screened for resistance to Phytophthora root rot, anthracnose, bacterial wilt, spotted alfalfa aphid and blue alfalfa aphid for one to four cycles beginning in 1974.

Breeder seed was produced on the parent plants under isolation near Nampa, Idaho in 1979 and 1980.

During seed multiplication, no variants beyond the limits defined under Exhibit C have been found, and multiplication procedures will ensure that seed being sold as 'Baron' will not be shifted in characteristics beyond presently acceptable limits for alfalfa varieties.

It is also confirmed that 'Baron' meets presently acceptable levels of uniformity for alfalfa varieties.



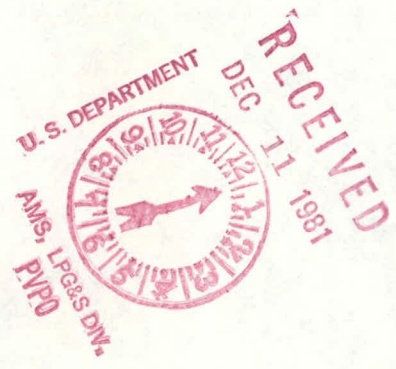
8200036

Exhibit B

Novelty Statement

'Baron'

'Baron' most closely resembles 'Caliverde 65'. 'Baron' has resistance to blue alfalfa aphid, while 'Caliverde 65' is susceptible.



8200036

10. GIVE ITEM LENGTH FREQUENCY DISTRIBUTION FOR SUBMITTED AND 1 TO 5 STANDARD VARIETIES 1/

VARIETY NAME	STEM LENGTH FREQUENCY DISTRIBUTION 2/ 0 – 5 mm. %	6 – 10 mm. %	11 – 15 mm. %	16 – 20 mm. %	21 – 30 mm. %	31 – 40 mm. %	41 – 50 mm. %	51 – 60 mm. %	61 – 70 mm. %	71 – 80 mm. %	81 + mm. %	AVERAGE STEM LENGTH
FLOWER COLOR												
No critical individual plant data. Approximately 97% purple and 3% variegated (blue) in the foundation field. In 1982, will take individual data on spaced plants.												

11. FLOWER COLOR 3/ (DETERMINE COLOR ON FRESHLY OPENED FLOWERS)

0 9 7 % PURPLE | 0 0 3 % VARIEGATED | CREAM | % WHITE

12. DISEASE, INSECT, AND NEMATODE RESISTANCE: (Enter r… Circle check cultivars used.)

DISEASE	CULTIVAR	% RESISTANT PLANTS	TEST, YEAR & LOCATION 4/
BACTERIAL WILT	Baron (SUBMITTED)	13.3	1981,
	(RES. CK.) VERNAL	32.9	University of Minnesota
	(SUS. CK.) NARRAGANSETT	1.5	
ANTHRACNOSE	Baron (SUBMITTED)	25.2	1981,
	(RES. CK.) ARC	67.4	North American Plant Breeders
	(SUS. CK.) SARANAC	0.7	Ames, Iowa
COMMON LEAF SPOT	(SUBMITTED)		
	(RES. CK.) RAMSEY		
	(SUS. CK.) RANGER		
DOWNY MILDEW	(SUBMITTED)		
	(RES. CK.) SARANAC		
	(SUS. CK.) KANZA		
PHYTOPHTHORA ROOT ROT	Baron (SUBMITTED)	33.6	1981,
	(RES. CK.) AGATE	38.0	University of Minnesota
	(SUS. CK.) SARANAC	1.4	
Fusarium wilt OTHER	Baron (SUBMITTED)	45.8	1981,
	Moapa-69 (RES. CK.)	84.1	University of Minnesota
	MnGN-1 (SUS. CK.)	1.8	

ADJ
17.0
42.0
1.9
25.2
67.4
0.7
38.0
43.0
1.6
41.4
76.0
1.6

1/ Preferred standards: Saranac, Vernal, Norseman, Lahontan, Mesa Sir… at 25° C with 20,000 lux of cool white florescent; 2,000 lux of incandescent filament light and twelve hours darkness at 5° C.

2/ From cotyledonary node to tip of stem 20 days after planting.

3/ For further clarification consult USDA Agricultural Handbook No. 4…

4/ Give: The institution in charge of test, (2) year, and (3) location of test. Describe test procedure if it differs from procedure suggested in ARS-NC-19, September 1974.

FORM APPROVED. OMB NO. 40-R3712

FORM GR 470-32
(3/75)

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

EXHIBIT C

OBJECTIVE DESCRIPTION OF VARIETY

Alfalfa (Medicago sativa L. complex)

NAME OF APPLICANT(S)
North American Plant Breeders

ADDRESS (*Street and No., or R.F.D. No., City, State, and Zip Code*)
North American Plant Breeders, 5201 Johnson Drive,
P. O. Box 2955, Mission, Kansas 66201

VARIETY NAME OR TEMPORARY DESIGNATION
Baron

FOR OFFICIAL USE ONLY

PVPO NUMBER
8200036

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

NOTE: For single plant data a minimum of 100 plants is suggested

1. PRIMARY AREA OF ADAPTATION

[5]
1 = NORTHWEST 2 = NORTHCENTRAL 3 = NORTHEAST
4 = SOUTHEAST 5 = SOUTHWEST 6 = SOUTHERN PLAINS
7 = INTERMOUNTAIN

INDICATE AREA WHERE TEST WAS CONDUCTED. FURTHER EXPLANATION CAN GO IN COMMENTS AT THE END OF THE FORM.

[2, 5] AREA TESTED

2. WINTER HARDINESS

[3]
1 = NON-HARDY (Mesa Sirsa) 3 = INTERMEDIATE NON-HARDY
5 = MODERATELY HARDY (Saranac) 7 = HARDY (Vernal)
9 = EXTREMELY HARDY (Norseman)

[5] AREA TESTED

[1] SOURCE OF INFORMATION: 1 = ANTICIPATED 2 = MEASURED

3. FALL GROWTH HABIT

[2]
1 = ERECT (Mesa Sirsa) 3 = SEMIERECT (DuPuits)
5 = INTERMEDIATE (Saranac) 7 = SEMIDECUMENT (Vernal)
9 = DECUMBENT (Norsement)

[2, 5] AREA TESTED

4. RECOVERY AFTER FIRST SPRING CUTTING

[2]
1 = VERY FAST (Mesa Sirsa) 3 = FAST (Saranac) 5 = INTERMEDIATE
7 = SLOW (Vernal) 9 = VERY SLOW (Norseman)

[5] AREA TESTED

5. FLOWERING DATE (FIRST SPRING GROWTH)

[ ][ ] DAYS EARLIER THAN . . . . .
[ ][ ] DAYS LATER THAN . . . . .

[ ]
1 = MESA SIRSA 2 = LAHONTAN
3 = SARANAC 4 = VERNAL
5 = NORSEMAN

[ ] AREA TESTED

6. CROWN TYPE

[7]
1 = SPREADING ROOTS 3 = SPREADING RHIZOMES (Teton)
5 = BROAD (Vernal) 7 = INTERMEDIATE (Saranac)
9 = NARROW (Mesa Sirsa)

[5] AREA TESTED

7. PLANT COLOR

[3]
3 = DARK GREEN (Weevlchek) 5 = GREEN (Vernal)
7 = LIGHT GREEN (Ranger)

[2, 5] AREA TESTED

8. HAIRINESS

[ ][ ][ ] % PLANTS WITH PUBESCENT STEMS

[ ][ ][ ] % PLANTS WITH PUBESCENT PODS

9. POD SHAPE

[ ][ ][ ] % PLANTS WITH TIGHT COILS

[ ][ ][ ] % PLANTS WITH LOOSE COILS

[ ][ ][ ] % PLANTS WITH SICKLE PODS (Less than 1 coil)

12. DISEASE, INSECT, AND NEMATODE RESISTANCE: (Enter resistance of submitted and check cultivars. Circle check cultivars used.)

INSECT	CULTIVAR	% RESISTANT PLANTS	AVG. SEVERITY INDEX (ASI)	ASI LSD .05	TEST, YEAR & LOCATION 4/
OTHER	(SUBMITTED)				
	(RES. CK.)				
	(SUS. CK.)				
NEMATODE	**CULTIVAR**	**% RESISTANT PLANTS**	**INDEX (ASI)**	**ASI LSD .05**	**TEST, YEAR & LOCATION 4/**
STEM NEMATODE	(SUBMITTED)				
	(RES. CK.) LAHONTAN				
	(SUS. CK.) RANGER				
NORTHERN ROOT KNOT NEMATODE	(SUBMITTED)				
	(RES. CK.) NEV. SYN. XX				
	(SUS. CK.) LAHONTAN				
SOUTHERN ROOT KNOT NEMATODE	(SUBMITTED)				
	(RES. CK.) MOAPA 69				
	(SUS. CK.) LAHONTAN				
OTHER	(SUBMITTED)				
	(RES. CK.)				
	(SUS. CK.)				

13. INDICATE A VARIETY THAT MOST CLOSELY RESEMBLES THE VARIETY SUBMITTED FOR THE FOLLOWING CHARACTERS:

CHARACTER	VARIETY	CHARACTER	VARIETY
AREA OF ADAPTATION	Caliverde 65	PLANT HEIGHT	Moapa-69
RECOVERY AFTER CUTTING	Moapa-69	WINTER HARDINESS	Caliverde 65

REFERENCES

Barnes, D.K., and C.H. Hanson, An Illustrated Summary of Genetic Traits in Tetraploid and Diploid Alfalfa, ARS Technical Bul. 1370.
Barnes, D.K., et al, Standard Tests to Characterize Pest Resistance in Alfalfa Varieties. ARS-NC-19, September 1974.
Nittler, L.W., G.W. McKee, and J.L. Newcomer, Principles and Methods of Testing Alfalfa Seed for Varietal Purity. New York Agricultural Experiment Station Bul. 807.
USDA Agricultural Handbook No. 424.

COMMENTS

12. DISEASE, INSECT, AND NEMATODE RESISTANCE: (Enter resistance of submitted and check cultivars. Circle check cultivars used.)

DISEASE	CULTIVAR	% RESISTANT PLANTS	AVG. SEVERITY INDEX (ASI)	ASI LSD .05	TEST, YEAR & LOCATION 4/
OTHER	(SUBMITTED)				
	(RES. CK.)				
	(SUS. CK.)				
OTHER	(SUBMITTED)				
	(RES. CK.)				
	(SUS. CK.)				

INSECT	CULTIVAR	% SEEDLING SURVIVAL	AVG' SEVERITY INDEX (ASI)	ASI LSD .05	TEST, YEAR & LOCATION 4/
PEA APHID	(SUBMITTED)				
	(RES. CK.) KANZA				
	(SUS. CK.) RANGER				
SPOTTED ALFALFA APHID	(SUBMITTED)				1981 Tucson, Arizona
	(RES. CK.) KANZA				test in progress,
	(SUS. CK.) RANGER				results soon.

INSECT	CULTIVAR	% DEFOLIATION	AVG. SEVERITY INDEX (ASI)	ASI LSD .05	TEST, YEAR & LOCATION 4/
ALFALFA WEEVIL	(SUBMITTED)				
	(RES. CK.) ARK				
	(SUS. CK.) VERNAL				

INSECT	CULTIVAR	% RESISTANT PLANTS	EMERGED ADULTS PER PLANT	EMERGED LSD .05	TEST, YEAR & LOCATION 4/
ALFALFA SEED CHALCID	(SUBMITTED)				
	(RES. CK.) LAHONTAN				
	(SUS. CK.) SONORA				

INSECT	CULTIVAR	% RESISTANT PLANTS	AVG. SEVERITY INDEX (ASI)	ASI LSD .05	TEST, YEAR & LOCATION 4/
POTATO LEAF-HOPPER	(SUBMITTED)				
	(RES. CK.)				
	(SUS. CK.)				
* Blue Alfalfa Aphid OTHER	Baron (SUBMITTED)	46.0		.05 es.	1980-81,
	Cuf 101 (RES. CK.)	32.7			North American Plant Breeders
	PA-1 (SUS. CK.)	0.5			Ames, Iowa

NO GOOD

4/ Give: The institution in charge of test, (2) year, and (3) locatic ure if it differs from procedure suggested in ARS-NC-19, September 1974.

* Resistance defined as those plants w longate after 5 weeks of heavy infestation when inoculated at the c the greenhouse.

From; Alfalfa Production in the low desert Valley areas of California
Leaf let 21097
University of California
July 1979

8200036

Table 3. Alfalfa Variety and Brand Ratings for Pest Resistance.*

	Pest or disease[1/]												
Variety or brand	**SAA**	**PA**	**BAA**	**PRR**	**Sc**	**Rz**	**BW**	**FW**	**S An**	**CLS**	**DM**	**SN**	**RKN**
	Tolerance or resistance[2/]												
Abunda Verde Brand	HR	T	T	T	T	—	S	T	S	—	—	S	—
Amador	R	S	S	R	—	—	S	—	S	—	T	S	T
Ardiente	T	T	—	T	T	—	T	—	—	T	T	R	—
AS-13	T	—	—	T	T	—	T	—	S	T	T	T	—
AS-13R	T	—	—	R	R	—	T	—	—	T	T	R	—
Caliente	T	T	—	S	S	—	T	—	S	T	T	S	—
Caliverde 65	HR	S	S	MT	—	—	R	—	S	MT	MT	HT	—
Condura 73 Brand	R	T	S	R	S	S	R	—	S	T	T	R	—
Converde 95 Brand	R	R	S	S	S	S	S	—	S	S	R	S	T
CUf 101	HR	R	R	MR	T	—	S	HR	S	S	MT	S	—
DeKalb Brand 183	R	S	S	T	—	—	S	—	S	T	T	S	—
DeKalb Brand 185	R	T	S	T	—	—	S	—	S	T	T	S	—
Diablo Verde Brand	R	R	S	S	—	—	T	MR	MT	MT	T	S	—
El Unico	R	S	T	S	S	S	—	—	—	S	T	S	T
Hayden	R	S	S	S	S	S	—	—	—	S	T	S	T
Imperial 70 Brand	R	—	S	T	—	—	—	—	—	—	—	S	S
Joaquin II	R	S	S	T	—	—	T	—	S	S	S	T	T
Lew	R	S	S	S	S	S	—	—	—	S	T	R	—
Matador	HR	S	S	T	—	—	MR	—	S	—	T	S	—
Maxidor	R	R	MR	MR	T	—	—	R	S	—	—	—	—
Mesa Sirsa	R	S	S	S	S	S	—	—	—	S	T	T	MT
Mesilla	R	R	S	T	—	—	—	R	—	—	—	T	—
Moapa 69	T	S	S	S	S	S	S	MR	S	S	S	S	T
Pioneer Brand 572	R	R	T	T	T	S	S	—	S	S	HR	S	—
Pioneer Brand 581	R	T	T	R	T	S	R	—	S	T	R	R	—
Resistador II	R	MT	S	T	—	—	HT	—	S	T	HT	R	—
Rincon	R	R	S	S	S	—	T	T	—	—	T	—	—
Sonora	T	S	S	S	S	S	S	—	—	S	T	S	MT
Sonora 70	T	S	S	S	S	S	S	—	—	S	S	S	MT
UC Cargo	R	T	S	T	T	S	S	HR	S	S	ST	S	—
UC Salton	R	T	S	T	T	S	S	HR	S	S	ST	S	—
Valador	R	T	S	R	T	—	—	—	MR	—	—	—	MR
WL 450	R	MR	S	T	S	S	MT	MR	T	T	R	R	T
WL 451	R	T	S	T	S	S	R	HT	T	T	T	T	S
WL 501R (El Dorado R)	R	MR	S	S	S	S	MR	R	T	T	T	S	S
WL 508	HR	R	S	T	S	T	S	MR	MR	T	R	S	HT
WL 512	HR	R	MT	MR	MT	T	MR	R	—	T	MR	R	T
WL 514	R	R	R	T	—	—	MR	MR	—	—	T	T	—
WL 600	R	R	MT	S	S	T	T	MR	T	T	MR	S	—
819 Brand	R	S	S	S	MT	—	S	—	S	—	S	S	MT
919 Brand	R	S	S	T	—	—	S	—	S	—	T	S	T

*Adapted from information compiled by V.L. Marble and published also in the "Proceedings of the Eighth California-Arizona Alfalfa Symposium."

1/ SAA = Spotted alfalfa aphid
PA = Pea aphid
BAA = Blue alfalfa aphid
PRR = Phytophthora root rot
Sc = Scald
Rz = Rhizoctonia stem and root canker
BW = Bacterial wilt

8

FW = Fusarium wilt
S An = Southern anthracnose
CLS = Common leaf spot
DM = Downy mildew
SN = Stem nematode
RKN = Root knot nematode species

2/ HR = Highly resistant
R = Resistant
MR = Moderately resistant
HT = Highly tolerant
T = Tolerant
MT = Moderately tolerant
ST = Slightly tolerant
S = Susceptible
— = No data available

Definitions:

R = Resistant. Ability of plants to restrict the activities of a specified pest.
T = Tolerant. Ability of plants to endure a specified pest or an adverse environmental condition, performing and producing in spite of the disorder.
S = Susceptible. Inability of plants to restrict the activities of a specified pest, or to withstand an adverse environmental condition.

How To Use Tensiometers

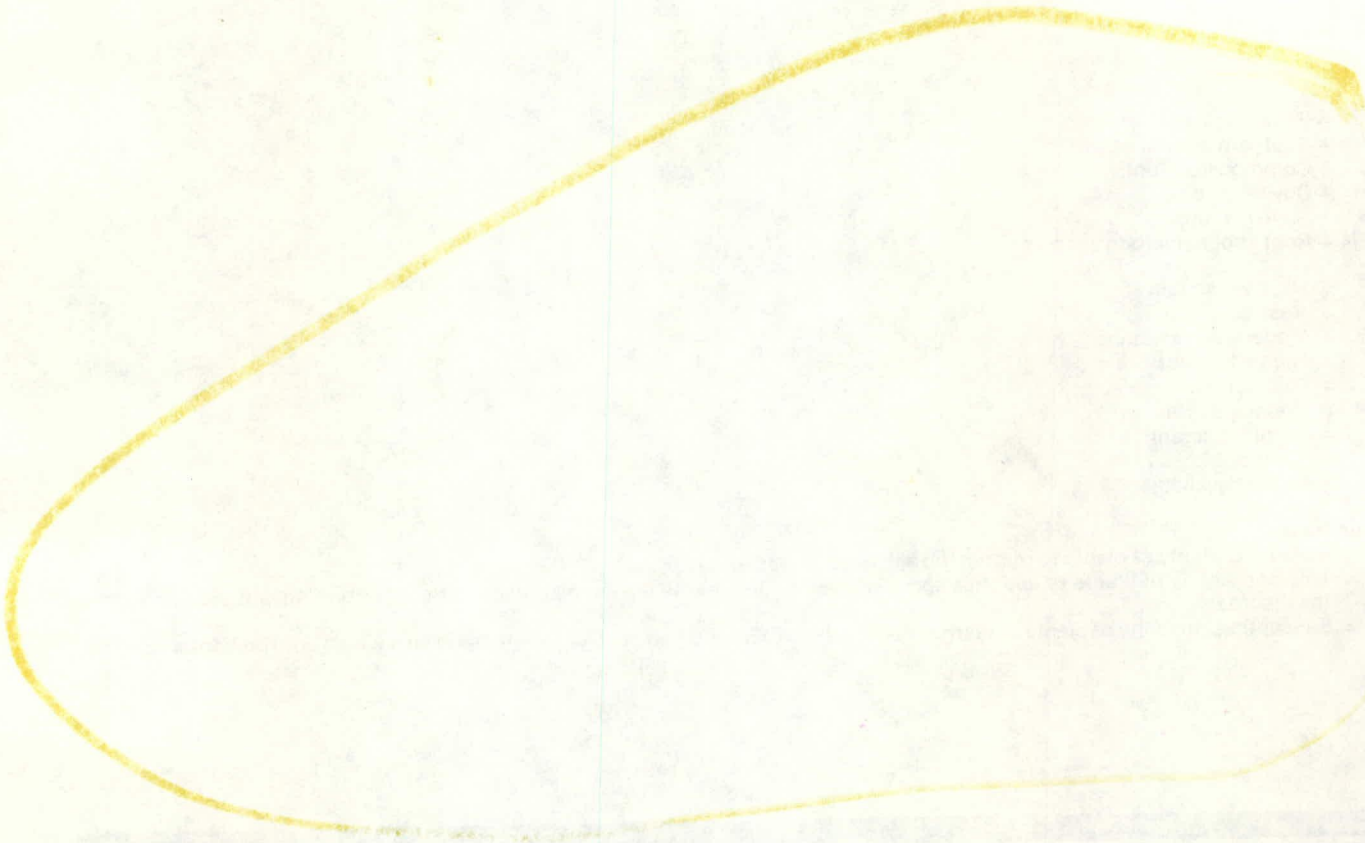
Tensiometers may be more difficult to manage in alfalfa fields than in other crops because alfalfa fields must be harvested several times a year. Tensiometers used in alfalfa must be protected to prevent damage during harvest operations. This requires either an above-ground enclosure, which may be a nuisance, or an underground implacement with protective coverage. The tensiometers must be read frequently, especially during the summer, and kept in an operating condition. Defective tensiometers should not be used as the extra work involved in reading and maintaining them may discourage many potential users. Many times tensiometers will be suspected of being defective, but they will usually be found to be in working condition and correctly reflecting the true water condition of the soil in which they were placed.

Even though tensiometers may not be generally accepted in alfalfa, they would have definite value in certain alfalfa fields where: (1) grower's experience or knowledge is limited and a means to evaluate the effects of irrigation is useful (2) problems of root and water penetration exist; (3) unknown dry layers or perched water tables are suspected; and (4) excessive soil wetness may occur and persist after irrigation.

Properly used tensiometers can be helpful, but they must be used along with other criteria generally used in determining an irrigation date. Some of these criteria are: crop response, prior personal experience in irrigating alfalfa, and knowledge of the area and the field. Because of soil differences more tensiometers than needed should be used until representative tensiometers can be isolated.

A relatively simple way to place tensiometers is to use six tensiometer locations in the field being checked. Three locations should be evenly spaced about 100 feet in from the intake end of the field, and the other three evenly spaced about 100 feet in from the drain end of the field. Two tensiometers should be placed at each location, with one about 1-foot deeper than the other: for an average field on a heavy soil, place tensiometers 12 and 24 inches below the surface of the soil. The locations should be placed near an irrigation levee so the instruments can be read when the field is wet.

The field should be irrigated when the average reading of the 12-inch deep tensiometers reaches about 45, but should be changed if found to be either too wet or too dry. The 24-inch deep tensiometers should be used primarily to monitor the moisture level at that depth, although they can also be used for scheduling irrigations. Mark (and perhaps protect) your tensiometer locations well—you will need to locate them from time to time, and the equipment operators must know where they are to avoid damaging them.



BILL OF SALE AND ASSIGNMENT

KNOW ALL MEN BY THESE PRESENTS that AGRIPRO BIOSCIENCES INC., a Delaware corporation (hereinafter referred to as "Seller"), pursuant to that certain Asset Purchase Agreement of even date herewith by and between Seller and AGR ACQUISITION CORPORATION, a Delaware corporation (hereinafter referred to as "Buyer") and for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, does hereby grant, bargain, sell, assign, convey and deliver unto Buyer, all of Seller's right, title and interest in and to the plant varieties owned/registered by Seller and more particularly set forth on Exhibit A attached hereto for which PVP Certificates have been issued by or may be pending before the U. S. Department of Agriculture.

TO HAVE AND TO HOLD UNTO PURCHASER, its successors and assigns forever.

IN WITNESS WHEREOF, Seller has executed this Bill of Sale and Assignment as of the 30th day of June, 1994.

AGRIPRO BIOSCIENCES INC.

BY: W. A. Zama

Title: Pros. dent

STATE OF KANSAS, COUNTY OF JOHNSON

Before me, the undersigned, a Notary Public of the State and County aforesaid, personally appeared W. A. ZAMA with whom I am personally acquainted (or proved to me on the basis of satisfactory evidence) and who, upon oath, acknowledged himself to be the PRESIDENT of Agripro Biosciences Inc., the within named bargainor, a corporation, and that he as such PRESIDENT, being authorized so to do, executed the foregoing instrument for the purposes therein contained by signing the name of the corporation by himself as PRESIDENT.

WITNESS my hand and Notarial Seal at office the day and year above written.

Alma M. Weaver
Notary Public

My Commission Expires:

June 22, 1998

ALMA M. WEAVER
NOTARY PUBLIC
STATE OF KANSAS
My Appt. Exp. June 22, 1998

State of Delaware

Office of the Secretary of State

I, EDWARD J. FREEL, SECRETARY OF STATE OF THE STATE OF DELAWARE, DO HEREBY CERTIFY THE ATTACHED IS A TRUE AND CORRECT COPY OF THE CERTIFICATE OF AMENDMENT OF "AGR ACQUISITION CORPORATION", CHANGING ITS NAME FROM "AGR ACQUISITION CORPORATION" TO "AGRIPRO SEEDS, INC.", FILED IN THIS OFFICE ON THE THIRTIETH DAY OF JUNE, A.D. 1994, AT 4:30 O'CLOCK P.M.

A CERTIFIED COPY OF THIS CERTIFICATE HAS BEEN FORWARDED TO THE NEW CASTLE COUNTY RECORDER OF DEEDS FOR RECORDING.

Edward J. Freel

SECRETARY OF STATE

2394087 8100

944121584

AUTHENTICATION: 7169071

DATE: 07-01-94

CERTIFICATE OF AMENDMENT
OF
CERTIFICATE OF INCORPORATION
OF
AGR ACQUISITION CORPORATION

AGR Acquisition Corporation, a corporation organized and existing under and by virtue of the General Corporation Law of the State of Delaware,

DOES HEREBY CERTIFY:

FIRST: that the Board of Directors of said corporation, by the unanimous written consent of its members filed with the minutes of the Board, adopted a resolution proposing and declaring advisable the following amendment to the Certificate of Incorporation of said corporation:

RESOLVED, that the Certificate of Incorporation of this corporation be amended by changing the Article thereof numbered "ARTICLE I" so that, as amended, said Article shall be and read as follows:

"ARTICLE I

Name

The name of the corporation (hereinafter called the 'Corporation') is Agripro Seeds, Inc."

SECOND: That in lieu of a meeting and vote of stockholders, the sole shareholder of the corporation has given unanimous written consent to said amendment in accordance with the provisions of Section 228 of the General Corporation Law of the State of Delaware.

THIRD: That the aforesaid amendment was duly adopted in accordance with the applicable provisions of Sections 242 and 228 of the General Corporation Law of the State of Delaware.

FOURTH: That the capital of said corporation shall not be reduced under or by reason of said amendment.

IN WITNESS WHEREOF, said AGR Acquisition Corporation has caused this certificate to be signed by Gary T. Hancock, its President, and attested by Ann Steelman, its Secretary, this 30th day of June, 1994.

AGR ACQUISITION CORPORATION

BY: Gary T. Hancock
Gary T. Hancock, President

ATTEST:

BY: Ann Steelman
Ann Steelman, Secretary